REMARKS/ARGUMENTS

Claims 6, 7, 9, 12-14, 16, 24 and 27-29 have been resubmitted. Claims 1-3, 5, 8, 10, 11, 15, 18-23, 25, 26 and 30 have been amended. Claims 4, 17 and 31-32 have been canceled. New claims 33-40 have been added.

The examiner objected to claim 17 because of informality. Claim 17 has been cancelled and the objection is moot.

The Examiner rejected Claims 1-7, 17, 20, 22-27 and 30-32 under 35 U.S.C. Section 102(b) as being anticipated by Ball. Claims 30-32 were also rejected under 35 U.S.C. Section 102(b) as being anticipated by Nichols. Claims 10-12 were rejected under 35 U.S.C. Section 103 as being unpatentable over Ball in view of Nichols. Claim 13 was rejected under 35 U.S.C. Section 103 as being unpatentable over Ball as modified by Obara in view of Profant et al. Claim 14 was rejected under 35 U.S.C. Section 103 as being unpatentable over Ball as modified by Obara in view of McInerney. Claims 28 and 29 were rejected under 35 U.S.C. Section 103 as being unpatentable over Ball in view of Obara.

The Examiner has deemed Claims 8, 9, 15, 16, 18 and 19 allowable if rewritten in dependent form including all of the limitations of the base claim and any intervening claims.

Allowed Subject Matter

Claims 8, 15 and 18 have been amended in accordance with the Examiner's analysis. In order to carry out the Examiner's proposal and to assure that all aspects of the invention are properly claimed, new dependent claims have been added. New claims 33-35, dependent on claim 8 and new

claims 36-40, dependent on claim 15 have been added. Claims 9, 16 and 19 are re-submitted without amendment because they are dependent on claims 8, 15 and 18 respectively.

Ball (3,671,137).

The Ball reference portrays a fluid pump with a so-called "hydrostatic" bearing. An impeller shaft rotates within a bearing lubricated with the same fluid that is pressurized by operation of the pump. As described in column 5, lines 50-60, this fluid flows through the bearing and produces a supporting and lubricating function for the impeller shaft.

In that regard, Ball utilizes an operating scheme that is quite different from the present invention. In the present case, a shaft bearing is lubricated with a lubricating substance that must not be dislodged from the bearing. In other words, the present invention is directed to preventing fluid flow through a bearing. The Ball reference shows a system for doing just the opposite; facilitating fluid flow through a bearing.

The structural elements of the present invention are combined to produce a balanced pressure on both sides of a bearing, thereby preventing a displacement of lubricant from the bearing.

Claim 1 has been amended to more accurately define this structure. A plurality of annular grooves is now defined as being situated to control flow of high-pressure fluid across a downstream side of an impeller. This aspect of the invention is set forth in the specification in Paragraph [0028].

These grooves were defined in the Original version of claim 1 as being concentrically situated in relation to the shaft. This structural feature is not

disclosed in the Ball reference. It appears as though the annular grooves (unnumbered) cited by the Examiner are axially situated in relation to a shaft. In that regard, it appears as though Ball does not literally anticipate the Original version of Claim 1. Nevertheless, Claim 1 has been amended in an effort to more clearly define the present invention.

Claims 2 and 3 have been similarly amended to reflect a fluid flow control aspect of the structure of the present invention.

Claim 5 has been amended to further define an axial distribution of grooves on a shaft. In that regard, the shaft groove orientation is distinguished from grooves on an impeller that are distributed concentrically. As discussed with respect to claim 1 above, Ball does not disclose any concentrically situated grooves and thus does not anticipate the invention defined in claim 5 or its dependent claims 6 and 7.

Claims 17, 20 and 22 were deemed by the Examiner as anticipated by Ball. Claim 17 is canceled and claims 20 and 22 are amended to be dependent on claim 18, which is deemed allowable.

Claims 23-27 were deemed anticipated by Ball. Claim 24 is canceled. Independent claim 23 defines the invention as one that involves directing compressed gas to a downstream side of a bearing housing to counteract a pressure differential. This principle is not disclosed in Ball. Indeed, Ball relies on the existence of a pressure differential to produce a flow of lubricating fluid through a bearing. Nevertheless, claim 23 has been amended to more accurately define the concept of directing compressed gas to a downstream side of a bearing housing to counteract a pressure differential.

Claim 26 has been similarly amended. Claims 25 and 27 are dependent on claims 23 and 26 respectively.

Claim 30 was deemed anticipated by Ball. It has been amended to define a method of flowing gas around a bearing and not through the bearing. Ball shows a fluid flow through a bearing. Claim 30 is now distinct from the Ball reference.

Nichols (3,728,857)

Claims 30-32 were deemed anticipated by Nichols. They have been amended to define a method of flowing gas around a bearing and not through the bearing.

Nichols discloses a compressor that uses its working fluid as a bearing lubricant. A pressure balance scheme is described in Columns 3 and 4. Pressure balance is directed to controlling flow of fluid through a bearing. As is the case with Ball, Nichols does not anticipate the invention defined in amended claim 30. Claim 30 defines a method for producing flow of fluid around a bearing and not though it.

Obara (6,599,020)

Claims 10-13 were rejected on the basis of a combined teaching of Obara and Ball. Claim 10 has been amended to recite a seal gap element described as item 90 in Paragraph [0024] of the specification. The seal gap is a key element for achieving a desired pressure-balancing flow rate of fluid around a bearing.

Obara does teach use of a gap in a labyrinth seal. However, the utility of a gap in the Obara reference is reduction of wear in the seal. Wear of the seal in Obara is described as a problem because particulates from the wearing seal produce undesirable contamination.

There is no suggestion, in Obara or Ball either individually or in combination, of the utility of a seal gap in producing a pressure balance for a bearing structure.

Profant et al. (4,834,693)

Profant is cited in combination with Ball and Obara as a basis for rejecting claim 13. Claim 13 is dependent on Claim 10 that is amended as discussed above with respect to Obara. Applicant submits that Claim 10 is now patentably distinguishable from Ball and Obara. Consequently, addition of a further distinguishing feature of an aluminum shaft is supportive of the allowability of Claim 13.

McInerney (4,613,288)

McInerney is cited in combination with Ball and Obara as a basis for rejecting claim 14. Claim 14 is dependent on Claim 10 that is amended as discussed above with respect to Obara. Applicant submits that Claim 10 is now patentably distinguishable from Ball and Obara. Consequently, addition of a further distinguishing feature of an aluminum impeller is supportive of the allowability of Claim 14.

CONCLUSION

Reconsideration and withdrawal of the Office Action with respect to Claims 1-3, 5-16, and 18-40 is requested.

In the event the examiner wishes to discuss any aspect of this response, please contact the attorney at the telephone number identified below.

Respectfully submitted,

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